MATHS

NCERT - NCERT MATHEMATICS(GUJRATI)

MATRICES

Example

1. Consider the following information regarding the number of men and women workers in three factories. I, II and III. Men workers Women workers I 30 25 II 25 31 III 27 26 Represent the above information in the form of 3×2 matrix. What does the entry in the third row and second column represent?

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2. If a matrix has 8 elements, what are the possible orders it can have?

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3. Construct a 3×2matrix whose elements are given by $a_{ij} = \frac{1}{2}|i - 3j|$.

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4. If $\begin{bmatrix} x+3 & z+4 & 2y-7 \\ -6 & a-1 & 0 \\ b-3 & -21 & 0 \end{bmatrix} = \begin{bmatrix} 0 & 6 & 3y-2 \\ -6 & -3 & 2c+2 \\ 2b+4 & -21 & 0 \end{bmatrix}$ Find the values of a, b, c,x,y and z

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5. Find the values of a, b, c and d from the following equations:

$[2a + ba - 2b5c - d4c + 3d] = [4 - 31124]$

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6. Given $A = \left[\sqrt{3}213 - 10\right]$ and $B = \left[2 - 2\sqrt{5}31\frac{1}{2}\right]$, find $A \quad + B$.

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7. If $A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 3 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} 3 & -1 & 3 \\ -1 & 0 & 2 \end{bmatrix}$, then find $2A - B$.

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8. If $A = \begin{bmatrix} 8 & 0 \\ 4 & -2 \\ 3 & 6 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & -2 \\ 4 & 2 \\ -5 & 1 \end{bmatrix}$ then find the matrix X, such that 2A+3X=5B

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9. Find X and Y, if $X + Y = [5209]$ and $X - Y = [360 - 1]$.

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10. Find the values of x and y from the following equation:

$2[x57y-3]+[3-412]=[761514]$

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11. Two farmers Ramkishan and Gurcharan Singh cultivates only three varieties of rice namely Basmati, Permal and Naura. The sale (in Rupees) of these varieties of rice by both the farmers in the month of September and October are given by the following matrices A and B.

$$A = \begin{matrix} \text{Septermber Sales (in Rupees)} \\ \text{Basmati} \quad \text{Permal} \quad \text{Naura} \end{matrix} \begin{bmatrix} 10{,}000 & 20{,}000 & 30{,}000 \\ 50{,}000 & 30{,}000 & 10{,}000 \end{bmatrix} \begin{matrix} \text{Ramkishan} \\ \text{Gurcharan singh} \end{matrix}$$

$$B = \begin{matrix} \text{October Sales (in Rupees)} \\ \text{Basmati} \quad \text{Permal} \quad \text{Naura} \end{matrix} \begin{bmatrix} 5{,}000 & 10{,}000 & 6000 \\ 20{,}000 & 10{,}000 & 10{,}000 \end{bmatrix} \begin{matrix} \text{Ramkishan} \\ \text{Gurcharan singh} \end{matrix}$$

(i) Find the combined sales in September and October for each farmer in each variety.

(ii) Find the decrease in sales from September to October.

(iii) If both farmers receive 2% profit on gross sales, compute the profit for each farmer and for each variety sold in October.

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12. Find AB, if $A = \begin{bmatrix} 6 & 9 \\ 2 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & 6 & 0 \\ 7 & 9 & 8 \end{bmatrix}$.

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13. If $A = \begin{bmatrix} 1 & -2 & 3 \\ -4 & 2 & 5 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & 3 \\ 4 & 5 \\ 2 & 1 \end{bmatrix}$, find AB and BA and show that $AB \neq BA$

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14. If $A = \begin{bmatrix} 1 & 0 \\ 0 & -1 \end{bmatrix}$ and $B = \begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}$, then $AB = \begin{bmatrix} 0 & 1 \\ -1 & 0 \end{bmatrix}$. and $BA = \begin{bmatrix} 0 & -1 \\ 1 & 0 \end{bmatrix}$. Clearly $AB \neq BA$.

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15. Find AB, if $A = \begin{bmatrix} 0 & -1 \\ 0 & 2 \end{bmatrix}$ and $B = \begin{bmatrix} 3 & 5 \\ 0 & 0 \end{bmatrix}$.

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16. If $A = \begin{bmatrix} 1 & 1 & -1 \\ 2 & 0 & 3 \\ 3 & -1 & 2 \end{bmatrix}, B = \begin{bmatrix} 1 & 3 \\ 0 & 2 \\ -1 & 4 \end{bmatrix}$ and $C = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 0 & -2 \end{bmatrix}$.

prove that $(AB)C = A(BC)$

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17. If $A = [067 - 6087 - 80]$, $B = [011102120]$, $C = [2 - 23]$Calculate

AC, BC and $(A + B)C$. Also, verify that $(A + B)C = AC + BC$

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18. If $A + l = \begin{bmatrix} 2 & 2 & 3 \\ 3 & -1 & 1 \\ 4 & 2 & 2 \end{bmatrix}$ then show that $A^3 - 23A - 40l = 0$

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19. In a parliament election, a political party hired a public relations firm to promote its candidates in three ways telephone, house calls and letters. The cost per contact (in paisa) is given in matrix A as $A = [140200150]TelephoneHouse\ callsLeers$ The number of contacts of each type made in two cities X and Y is given in the matrix B as

Telephone House call Letters

$B = [1000 \quad 500 \quad 50003000 \quad 1000 \quad 10000]City\ XCity\ Y$

Find the total amount spent by the party in the two cities. What should one consider before casting his/her vote partys promotional activity or their social activities?

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20. .If $A = \begin{bmatrix} 3 & \sqrt{3} & 2 \\ 4 & 2 & 0 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & -1 & 2 \\ 1 & 2 & 4 \end{bmatrix}$,then verify that $(A + B)' = A' + B'$

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21. If A= $\begin{bmatrix} -2 \\ 4 \\ 5 \end{bmatrix}$, B=(1,3-6) verify that $(AB)' = B'A'$

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22. Express the matrix $B = [2 - 2 - 4 - 1341 - 2 - 3]$ as the sum of a symmetric and a skew symmetric matrix.

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23. By using elementary operations, find the inverse of the matrix $A = \begin{bmatrix} 1 & 2 \\ 2 & -1 \end{bmatrix}$.

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24. Obtain the inverse of the following matrix using elementary operations $A = [012123311]$.

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25. Find P^{-1}, if it exists, given $P = [10 - 2 - 51]$.

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26. If $A = \begin{bmatrix} \cos\theta & \sin\theta \\ -\sin\theta & \cos\theta \end{bmatrix}$, then prove that $A^n = \begin{bmatrix} \cos n\theta & \sin n\theta \\ -\sin n\theta & \cos n\theta \end{bmatrix}, n \in N$

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27. If A and B are symmetric matrices of the same order, then show that AB is symmetric if and only if A and B commute, that is $AB = BA$.

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28. Let $A - [2 - 134], B - [5274], C - [2538]$. Find a matrix D such that

$CD - AB \quad = \quad 0$

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Exercise 3 1

1. in the matrix $a = \begin{bmatrix} 2 & 5 & 19 & -7 \\ 35 & -2 & \frac{5}{2} & 12 \\ \sqrt{3} & 1 & -5 & 17 \end{bmatrix}$, write:

(i) the order of the matrix,

(ii) the number of elements ,

(iii) write the elements ,$a_{13}, a_{21}, 1_{33}, 1_{24}, a_{23}$.

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2. If a matrix has 24 elements , what are the possible orders it can have?

What if it has 13 elements?

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3. If a matrix has 18 elements, what are the possible orders it can have? What, if it has 5 elements?

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4. Construct a 2 * 2 matrix, A = $[a_{ij}]$, whose elements are given by: $a_{ij} = \frac{(i+j)^2}{2}$

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5. Construct a 3×4matrix, whose elements are given by:(i) $a_{ij} = \frac{1}{2}|-3i+j|$ (ii) $a_{ij} = 2i - j$

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6. find the values of x,y and zfrom the following equations :

$(i)\begin{bmatrix}4 & 3\\ x & 5\end{bmatrix}=\begin{bmatrix}y & z\\ 1 & 5\end{bmatrix}$

$(ii)\begin{bmatrix}x+y & 2\\ 5+z & xy\end{bmatrix}=\begin{bmatrix}6 & 2\\ 5 & 8\end{bmatrix}$

$(iii)\begin{bmatrix}x+y+z\\ x+z\\ y+z\end{bmatrix}=\begin{bmatrix}9\\ 5\\ 7\end{bmatrix}$

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7. Find the value of a, b, c and d from the equation:

$[a-b2a+c2a-b3c+d]=[-15013]$

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8. Let $A=\left[a_{ij}\right]_{n\times n}$ be a square matrix and let c_{ij} be cofactor of a_{ij} in A.

If $C=\left[c_{ij}\right]$, then

A. $m<n$

B. $m>n$

C. $m = n$

D. None of these

Answer: C

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9. Which of the given values of x and y make the following pair of matrices equal $\begin{bmatrix} 3x+7 & 5 \\ y+1 & 2-3x \end{bmatrix}, \begin{bmatrix} 0 & y-2 \\ 8 & 4 \end{bmatrix}$

A. $x = \frac{-1}{3}, y = 7$

B. Not possible to find

C. $y = 7, x = \frac{-2}{3}$

D. $x = \frac{-1}{3}, y = \frac{-2}{3}$

Answer: B

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10. The number of all possible matrices of order 3×3 with each entry 0 or 1 is (a) 27 (b) 18 (c) 81 (d) 512

A. 27

B. 18

C. 81

D. 512

Answer: D

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Exercise 3 2

1. $A = \begin{bmatrix} 2 & 4 \\ 3 & 2 \end{bmatrix}, B = \begin{bmatrix} 1 & 3 \\ -2 & 5 \end{bmatrix}, C = \begin{bmatrix} -2 & 5 \\ 3 & 4 \end{bmatrix}$

find each of the following :

(i) A+B (ii) A-B

(iii) 3A-C (iv) AB

(V) BA

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2. compute the following :

$(i)\begin{bmatrix} a & b \\ -b & a \end{bmatrix} + \begin{bmatrix} a & b \\ b & a \end{bmatrix}$

$(ii)\begin{bmatrix} a^2+b^2 & b^2+c^2 \\ a^2+c^2 & a^2+b^2 \end{bmatrix} + \begin{bmatrix} 2ab & 2bc \\ -2ac & -2ab \end{bmatrix}$

$(iii)\begin{bmatrix} -1 & 4 & -6 \\ 8 & 5 & 16 \\ 2 & 8 & 5 \end{bmatrix} + \begin{bmatrix} 12 & 7 & 6 \\ 8 & 0 & 5 \\ 3 & 2 & 4 \end{bmatrix}$

$(iv)\begin{bmatrix} \cos^2 x & \sin^2 x \\ \sin^2 x & \cos^2 x \end{bmatrix} + \begin{bmatrix} \sin^2 & \cos^2 x \\ \cos^2 x & \sin^2 x \end{bmatrix}$

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3. Compute the indicated products:

(i) $\begin{bmatrix} a & b \\ -b & a \end{bmatrix}\begin{bmatrix} a & -b \\ b & a \end{bmatrix}$

(ii) $\begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix}\begin{bmatrix} 2 & 3 & 4 \end{bmatrix}$

(iii) $\begin{bmatrix} 1 & -2 \\ 2 & 3 \end{bmatrix}\begin{bmatrix} 1 & 2 & 3 \\ 2 & 3 & 1 \end{bmatrix}$

(iv) $\begin{bmatrix} 2 & 3 & 4 \\ 3 & 4 & 5 \\ 4 & 5 & 6 \end{bmatrix}\begin{bmatrix} 1 & -3 & 5 \\ 0 & 2 & 4 \\ 3 & 0 & 5 \end{bmatrix}$

(v) $\begin{bmatrix} 2 & 1 \\ 3 & 2 \\ -1 & 1 \end{bmatrix}\begin{bmatrix} 1 & 0 & 1 \\ -1 & 2 & 1 \end{bmatrix}$

(vi) $\begin{bmatrix} 3 & -1 & 3 \\ -1 & 0 & 2 \end{bmatrix}\begin{bmatrix} 2 & -3 \\ 1 & 0 \\ 3 & 1 \end{bmatrix}$

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4.

if $A = \begin{bmatrix} 1 & 2 & -3 \\ 5 & 0 & 2 \\ 1 & -1 & 1 \end{bmatrix}, B = \begin{bmatrix} 3 & -1 & 2 \\ 4 & 2 & 5 \\ 2 & 0 & 3 \end{bmatrix}$ and $c = \begin{bmatrix} 4 & 1 & 2 \\ 0 & 3 & 2 \\ 1 & -2 & 3 \end{bmatrix}$,

then compure (A+B) and (B-C), Also , verify that A+(B-C)=(A+B)-C.`

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5. $A = \begin{bmatrix} \frac{2}{3} & 1 & \frac{5}{3} \\ \frac{1}{3} & \frac{2}{3} & \frac{4}{3} \\ \frac{7}{3} & 2 & \frac{2}{3} \end{bmatrix}$ and $B = \begin{bmatrix} \frac{2}{5} & \frac{3}{5} & 1 \\ \frac{1}{5} & \frac{2}{5} & \frac{4}{5} \\ \frac{7}{5} & \frac{6}{5} & \frac{2}{5} \end{bmatrix}$ then compute 3A-5B =

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6. Show that $\cos\theta.\begin{bmatrix}\cos\theta & \sin\theta\\ -\sin\theta & \cos\theta\end{bmatrix}+\sin\theta.\begin{bmatrix}\sin\theta & -\cos\theta\\ \cos\theta & \sin\theta\end{bmatrix}=I.$

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7. $2X+3Y=\begin{bmatrix}2 & 3\\ 4 & 0\end{bmatrix}$ and $3X+2Y=\begin{bmatrix}2 & -2\\ -1 & 5\end{bmatrix}$

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8. Find X, if $Y=[3214]$and $2X+Y=[10-32]$

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9. Find the values of x and y, if

$$2\begin{bmatrix}1 & 3\\ 0 & x\end{bmatrix}+\begin{bmatrix}y & 0\\ 1 & 2\end{bmatrix}=\begin{bmatrix}5 & 6\\ 1 & 8\end{bmatrix}.$$

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10. Find $x,\ y,\ z,\ t$ if $2[xzyt] + 3[1 - 102] = 3[3546]$.

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11. if $x\begin{bmatrix}2\\3\end{bmatrix} + Y\begin{bmatrix}-1\\1\end{bmatrix} = \begin{bmatrix}10\\5\end{bmatrix}$, find the values of X x and y.

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12. Given $3[xyzw] - [x6 - 12w] + [4x + yz + w3]$, find the values of x, y, z and w.

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13. If $F(x) = \begin{bmatrix}\cos x & -\sin x & 0\\ \sin x & \cos x & 0\\ 0 & 0 & 1\end{bmatrix}$ show that F(x)F(y)=F(x+y)`

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14. show that

$$(i)\begin{bmatrix}5 & -1\\ 6 & 7\end{bmatrix}\begin{bmatrix}2 & 1\\ 3 & 4\end{bmatrix} \neq \begin{bmatrix}2 & 3\\ 3 & 4\end{bmatrix}\begin{bmatrix}5 & -1\\ 6 & 7\end{bmatrix}$$

$$(ii)\begin{bmatrix}1 & 2 & 3\\ 0 & 1 & 0\\ 1 & 1 & 0\end{bmatrix}\begin{bmatrix}-1 & 1 & 0\\ 0 & -1 & 1\\ 2 & 3 & 4\end{bmatrix}$$

$$\neq \begin{bmatrix}-1 & 1 & 0\\ 0 & -1 & 1\\ 2 & 3 & 4\end{bmatrix}\begin{bmatrix}1 & 2 & 3\\ 0 & 1 & 0\\ 1 & 1 & 0\end{bmatrix}$$

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15. Find $A^2 - 5A + 6I$, if $A = [2012131 - 10]$

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16. If $A = [102021203]$, prove that $A^3 - 6A^2 + 7A + 2I = 0$

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17. If A $A = [3 - 24 - 2]$and $I = [1001]$, find k so that $A^2 = kA - 2I$.

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18. Let $A = [0 - \tan(\alpha/2)\tan(\alpha/2)0]$ and I be the identity matrix of order 2. Show that $I + A = (I - A)[\cos\alpha - \sin\alpha\sin\alpha\cos\alpha]$.

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19. A trust fund has Rs 30,000 that must be invested in two different types of bonds. The first bond pays 5% interest per year, and the second bond pays 7% interest per year. Using matrix multiplication, determine how to divide Rs 30,000 among the tw

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20. The bookshop of a particular school has 10 dozen chemistry books, 8 dozen physics books, 10 dozen economics books. Their selling prices are Rs 80, Rs 60 and Rs 40 each respectively. Find the total amount the bookshop will receive from selling all

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21. Assume X, Y, Z, W and P are matrices of order $2 \times n$, $3 \times k$, $2 \times p$, $n \times 3$ and $p \times k$, respectively. Choose the correct answer The restriction on n, k and p so that $PY + WY$ will be defined are: (A) $k = 3, p = n$ (B)

A. $k = 3, p = n$

B. k is arbitrary, $p = 2$

C. p is arbitrary, $k = 3$

D. $k = 2, p = 3$

Answer: A

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22. Assume X, Y, Z, W and P are matrices of order $2 \times n$, $3 \times k$, $2 \times p$, $n \times 3$ and $p \times k$, respectively. Choose the correct answer The restriction

on n, k and p so that $PY + WY$ will be defined are: (A) $k = 3, p = n$ (B)

A. $p \times 2$

B. $2 \times n$

C. $n \times 3$

D. $p \times n$

Answer: B

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Exercise 3 3

1. Find the transpose of each of the following matrices:

$(i)\begin{bmatrix} 5 \\ \frac{1}{2} \\ -1 \end{bmatrix} (ii)\begin{bmatrix} 1 & -1 \\ 2 & 3 \end{bmatrix}$,

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2. If $A = \begin{bmatrix} -1 & 2 & 3 \\ 5 & 7 & 9 \\ -2 & 1 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} -4 & 1 & -5 \\ 1 & 2 & 0 \\ 1 & 3 & 1 \end{bmatrix}$, then verify that (i) (A+B)'=A'+B' (ii) (A-B)'=A'-B'

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3. if $A' = \begin{bmatrix} 3 & 4 \\ -1 & 2 \\ 0 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} -1 & 2 & 1 \\ 1 & 2 & 3 \end{bmatrix}$, then verify that $(i)(A+B)' = A' + B' (ii)(A_B)' = A - B'$

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4. If $A' = \begin{bmatrix} -2 & 3 \\ 1 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} -1 & 0 \\ 1 & 2 \end{bmatrix}$, find $[A + 2B]'$.

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5. For the matrices A and B, verify that $(AB)' = B'A'$, where(i) $A = [1 - 43], B = [-121]$ (iii) $A = [012], B = [157]$

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6. If $A = [\cos\alpha \sin\alpha - \sin\alpha \cos\alpha]$, then verify that $A^T A = I_2$.

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7. If $A = [\sin\alpha \cos\alpha - \cos\alpha \sin\alpha]$, verify that $A^T A = I_2$.

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8. Show that the matrix $[[1, -15], [-1, 2, 1], [5, 1, 3]]$ is symmetric.

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9. Show that the matrix $A = \begin{bmatrix} 0 & 1 & -1 \\ -1 & 0 & 1 \\ 1 & -1 & 0 \end{bmatrix}$ is a skew symmetric matrix.

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10. for the matrix $A = \begin{bmatrix} 1 & 5 \\ 6 & 7 \end{bmatrix}$, verify that :

(I) (A+A') is a symmetric matrix.

(ii) (A-A') is a skew symmetric matrix.

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11. If $A = \begin{bmatrix} 0 & a & b \\ -a & 0 & c \\ -b & -c & 0 \end{bmatrix}$ find $\frac{1}{2}(A + A')$ and $\frac{1}{2}(A - A')$

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12. Express the following matrices as the sum of a symmetric and a skew symmetricmatrix:(i) $[351 - 1]$ (ii) $[6 - 22 - 23 - 12 - 13]$ (iii) $[33 - 1 - 2 - 21452]$ (iv) $[15 - 12]$

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13. If A, B are symmetric matrices of same order, then $AB - BA$ is a

A. Skew symmetric matrix

B. Symmetric matrix

C. Zero matrix

D. Identity matrix

Answer: A

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14. $A = \begin{bmatrix} \cos\alpha & -\sin\alpha \\ \sin\alpha & \cos\alpha \end{bmatrix}$ and $A + A^T = I$, find the value of α.

A. $\frac{\pi}{6}$

B. $\frac{\pi}{3}$

C. π

D. $\frac{3\pi}{2}$

Answer: B

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Exercise 3 4

1. Using elementary transformations, find the inverse of the matrix $[1 - 123]$

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2. Using elementary transformations, find the inverse of the matrix$[2111]$

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3. Using elementary transformations, find the inverse of the matrix$[1327]$

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4. Using elementary transformations, find the inverse of the matrices

$$\begin{bmatrix} 2 & 3 \\ 5 & 7 \end{bmatrix}$$

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5. Using elementary transformations, find the inverse of the matrices

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6. Using elementary transformations, find the inverse of the matrices $[2513]$

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7. Using elementary transformations, find the inverse of the matrix $[3152]$

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8. Using elementary transformations, find the inverse of the matrix $[4534]$

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9. Using elementary transformations, find the inverse of each of the matrices $[31027]$

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10. Using elementary transformations, find the inverse of the matrices

$$\begin{bmatrix} 3 & -1 \\ -4 & 2 \end{bmatrix}$$

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11. Using elementary transformations, find the inverse of each of the matrices $[2-61-2]$

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12. Using elementary transformations, find the inverse of the matrix $[6 - 3 - 21]$

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13. Using elementary transformations, find the inverse of the matrix $[2 - 3 - 12]$

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14. Using elementary transformations, find the inverse of the matrices

$$\begin{bmatrix} 2 & 1 \\ 4 & 2 \end{bmatrix}$$

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15. Using elementary transformations, find the inverse of the matrices

$$\begin{bmatrix} 2 & -3 & 3 \\ 2 & 2 & 3 \\ 3 & -2 & 2 \end{bmatrix}$$

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16. Using elementary transformations, find the inverse of the matrix

$[13 - 2 - 30 - 5250]$

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17. Using elementary transformations, find the inverse of the matrices

$$\begin{bmatrix} 2 & 0 & -1 \\ 5 & 1 & 0 \\ 0 & 1 & 3 \end{bmatrix}$$

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18. Matrices A and B will be inverse of each other only if (A) $AB = BA$ (B) $AB = BA = 0$ (C) $AB = 0, BA = I$ (D) $AB = BA = I$

A. AB = BA

B. AB = BA = 0

C. AB = 0, BA = I

D. AB = BA = I

Answer: D

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Miscellaneous Exercise On Chapter 3

1. Let A $A = \begin{bmatrix} 0 & 1 \\ 0 & 0 \end{bmatrix}$, show that $(aI + bA)^n = a^n I + na^{n-1}bA$, where I is the identity matrix of order 2 and $n \in N$.

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2. If $A = [111111111]$, prove that $A^n = [3^{n-1}3^{n-1}3^{n-1}3^{n-1}3^{n-1}3^{n-1}3^{n-1}3^{n-1}3^{n-1}]$, $n \in N$.

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3. If $A = [3 - 41 - 1]$, then prove that $A^n = [1 + 2n - 4 \cap 1 - 2n]$, where n is any positive integer.

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4. If A and B are symmetric matrices, prove that AB BA is a skew symmetric matrix.

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5. Show that the matrix $B^T AB$ is symmetric or skew-symmetric according as A is symmetric or skew-symmetric.

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6. Find the values of x, y, z if the matrix $A = [02yzxy - zx - yz]$ satisfy the equation $A^T A = I_3$.

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7. for what values of x:

$$[1 \quad 2 \quad 1]\begin{bmatrix} 1 & 2 & 0 \\ 2 & 0 & 1 \\ 1 & 0 & 2 \end{bmatrix}\begin{bmatrix} 0 \\ 2 \\ x \end{bmatrix} = 0?$$

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8. if $A = \begin{bmatrix} 3 & 1 \\ -1 & 2 \end{bmatrix}$, show that $A^2 - 5A + 7I = 0$.

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9. find x, if

$$[x \quad -5 \quad -1]\begin{bmatrix}1 & 0 & 2\\ 0 & 2 & 1\\ 2 & 0 & 3\end{bmatrix}\begin{bmatrix}x\\ 4\\ 1\end{bmatrix} = 0$$

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10. A manufacturer produces three products x, y, z which he sells in two markets. Annual sales are indicated below: Market Products I 10.000 2.000 18.000 II 6.000 20.000 8.000 (a) If unit sale prices of x, y and z are Rs 2.50, Rs 1.50 and Rs 1.0

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11. Find the matrix X so that $X[123456] = [-7-8-9246]$

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12. If A and B are square matrices of the same order such that $AB = BA$, then proveby induction that $AB^n = B^n A$. Further, prove that $(AB)^n = A^n B^n$for all $n \in N$.

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13. If $A = [\alpha\beta\gamma - \alpha]$ is such that $A^2 = I$, then $1 + \alpha^2 + \beta\gamma = 0$ (b) $1 - \alpha^2 + \beta\gamma = 0$ (c) $1 - \alpha^2 - \beta\gamma = 0$ (d) $1 + \alpha^2 - \beta\gamma = 0$

A. $I + \alpha^2 + \beta\gamma = 0$

B. $I - \alpha^2 + \beta\gamma = 0$

C. $I - \alpha^2 - \beta\gamma = 0$

D. $I + \alpha^2 - \beta\gamma = 0$

Answer: C

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14. If the matrix A is both symmetric and skew symmetric, then (A) A is a diagonal matrix (B) A is a zero matrix (C) A is a square matrix (D) None of these

A. A is a diagonal matrix

B. A is a zero matrix

C. A is a square matrix

D. None of these

Answer: B

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15. If A is square matrix such that $A^2 = A$, then $(I + A)^3 - 7A$ is equal to (A) A (B) $I \quad A$ (C) I (D) 3A

A. A

B. $I - A$

C. I

D. 3A

Answer: C

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